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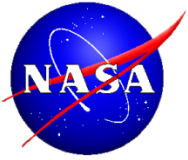
*Global Precipitation Measurement (GPM) mission*

**IGARSS 2011**

# **GPM Data Product and Services**

**Erich Franz Stocker, NASA/GSFC Code 610.2**

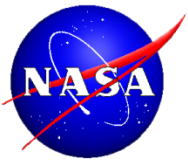
*Erich.F.Stocker@nasa.gov*



# Topics



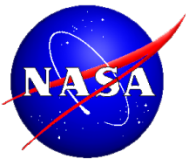
- **Type of data products**
- **Swath Data Products**
- **Level 3 time/space gridded**
- **Data Services**
- **Summary**



# Type of Data Products



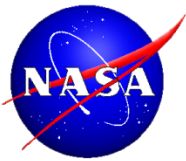
- **Near realtime**
  - Swath
  - Gridded
- **Regular**
  - Swath
  - Gridded
  - Gridded (GIS focused)
- **Special**
  - User products
  - Gridded text products
- **“Outreach”**
  - Updating rainmap
  - Google map product
  - Rainmap app for smartphone



# Near realtime Swath Products



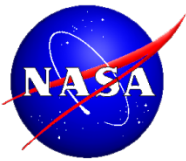
- **GMI 5 min (with 50 scans overlap)  $T_b$  and  $T_c$  IFOV products (available within 1 hour of data collection 90% of time)**
- **GMI 5 min GPROF-based precipitation retrieval products (available within 75min of data collection 90% of time)**
- **Combined GMI/DPR precipitation retrieval product (available within 180 minutes of collection 90% of time)**
- **Constellation radiometer (partner)  $T_c$  IFOV products (data latency depends upon partner but generally no more than 180 minutes from collection)**
- **Constellation radiometer GPROF precipitation retrieval products (data latency an additional 15min from  $T_c$ )**



# Regular Swath Products



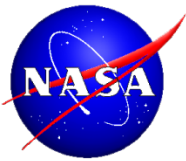
- **All are orbital in hdf5 1.8 (+) written to be compatible with netCDF4**
- **Orbit is established at the southern most point of the GPM core orbit (i.e. for GMI core 65S to 65N).**
- **Polar orbiting  $T_b$  products received will re-orbitized to a south to south orbit as part of the  $T_c$  Level 1C product generation**
- **L1 that PPS will distribute**
  - Level 1B GMI  $T_b$  and L1B DPR radar powers
  - Level 1C partner radiometer products (L1B partner products must be retrieved from the providing partner)
- **PPS will generate GPROF Level 2 products for**
  - GMI
  - Partner constellation radiometers
- **PPS along with JAXA MOSS will distribute DPR L2 products**
  - Ku, Ka, and Ku/Ka combined



# Gridded Products



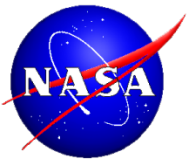
- **Instrument accumulated Level 3 data products at .25 x .25 degree resolution**
  - Daily
  - Monthly
  - GMI, DPR, Combined, constellation radiometer
  - Precipitation and Latent Heating
- **Merged radiometer product**
  - both near realtime and regular
  - Half hour .1 x .1 degree grid
  - In near realtime run twice
    - Once within ~hour of data collection fast but fewer radiometer
    - After 6 hours more radiometers
    - Early product more dependent on IR and morphing techniques
  - Production version uses rain gauge adjustment
  - Combination of current tmpa, morphing and neural net approach



# Additional Gridded Products



- **A gridded daily text (ASCII) product at .1 x .1 and .25 x .25 degree grids hourly-- packaged as daily files (like TRMM 3G series)**
  - Includes surface precipitation data from GPROF, DPR, and Combined.
- **A gridded daily text (ASCII) product at .1 x .1 and .25 x .25 degree grids hourly – packaged as daily files**
  - Contains surface precipitation information from partner imager radiometer data
  - Contains surface precipitation information from partner sounder data
- **Level 4 gridded model based or largely model driven data**

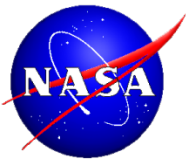


# User Products



- **GPM regular swath product are much larger than in TRMM**
  - DPR is about ~5GB per orbit and only a single product
  - Combined is about ~2.5 GB per orbit
- **PPS will create parameter subsets of standard products including only the parameters that TRMM ordering shows users desire**
  - Eliminate algorithm developer diagnostic values
  - Example: provide a radar reflectivity L2 product (aka TRMM 1C21)
  - Example: surface precipitation only products
- **User products are routinely produced and available via ftp or STORM retrieval**
- **Will add, modify or delete user products based on requests and ordering history**

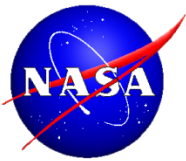




# PPS Services During GPM



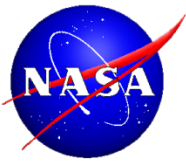
- **All data available online via anonymous ftp (two versions maintained)**
- ☐ **Science Team On-line Request Module (STORM) available to both registered and non-registered users (online querying and ordering)**
- **Subsetting services**
  - Parameter and/or geographical subsetting
  - Standing orders (including subsetting products) available to registered users
  - Special (ad-hoc) subsetting available to both registered and non-registered users through STORM
  - Long timeperiod data ordering and subsetting via email request.
- **GPM core overflight and coincident querying and predict tool**
- **Registered users receive up-to-date information about algorithm and processing status**



# Additional Services



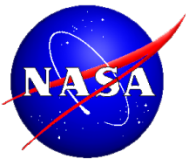
- **Data format conversion to GRIB2 and binary (and others as requested)**
- **Trending products**
  - Daily and long-term text and plots of key values of L1B/L1C
  - Daily and long-term text and plots of key geophysical parameters of L2 and above
- **Viewing software**
  - Allows viewing and “ad-hoc” subset of viewed object
  - Allows viewing of all GPM products including 1C products produced by partner radiometers
  - Allows viewing of GPM core GMI count data (L1A)



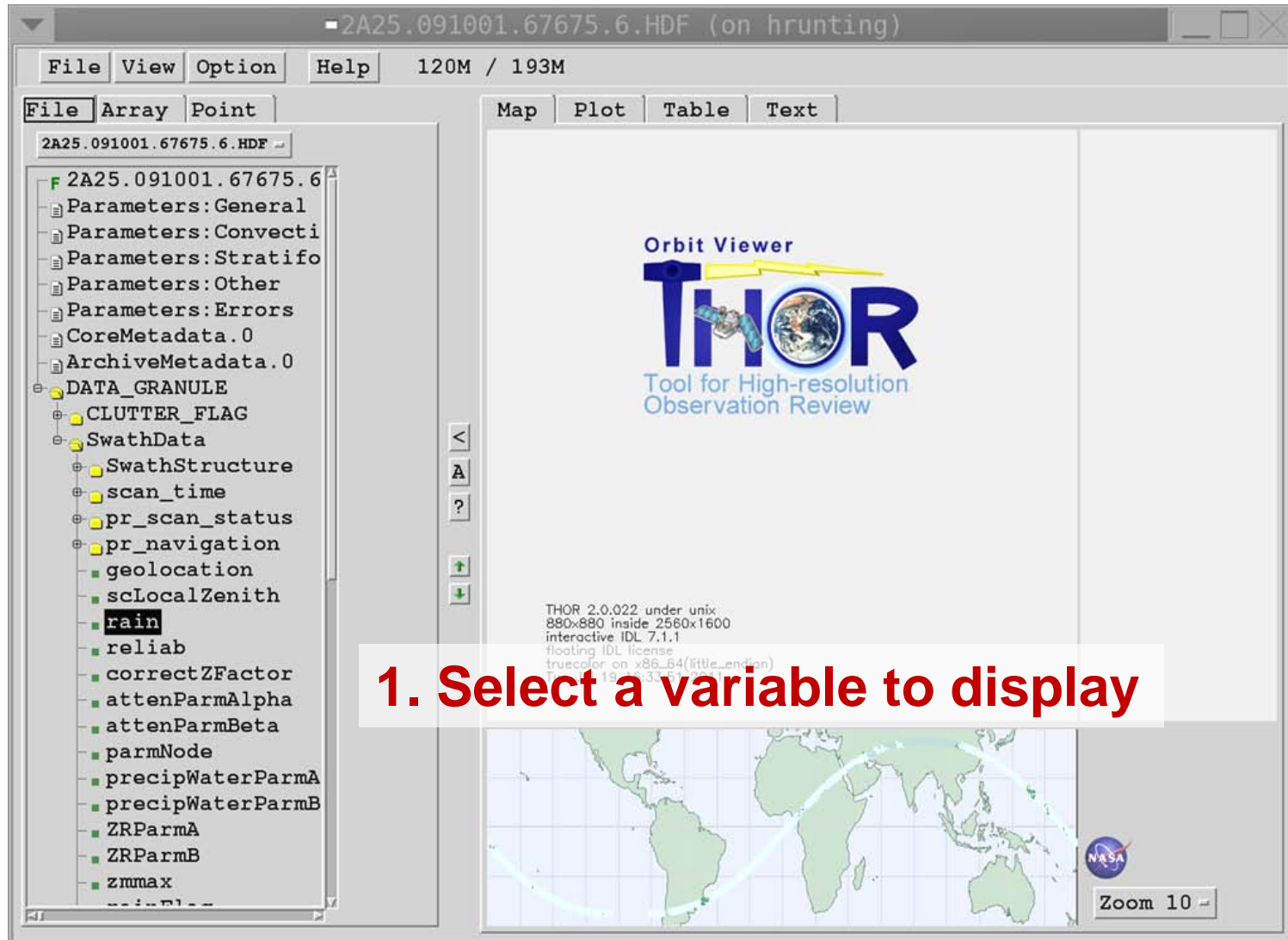
# THOR Desktop Viewer

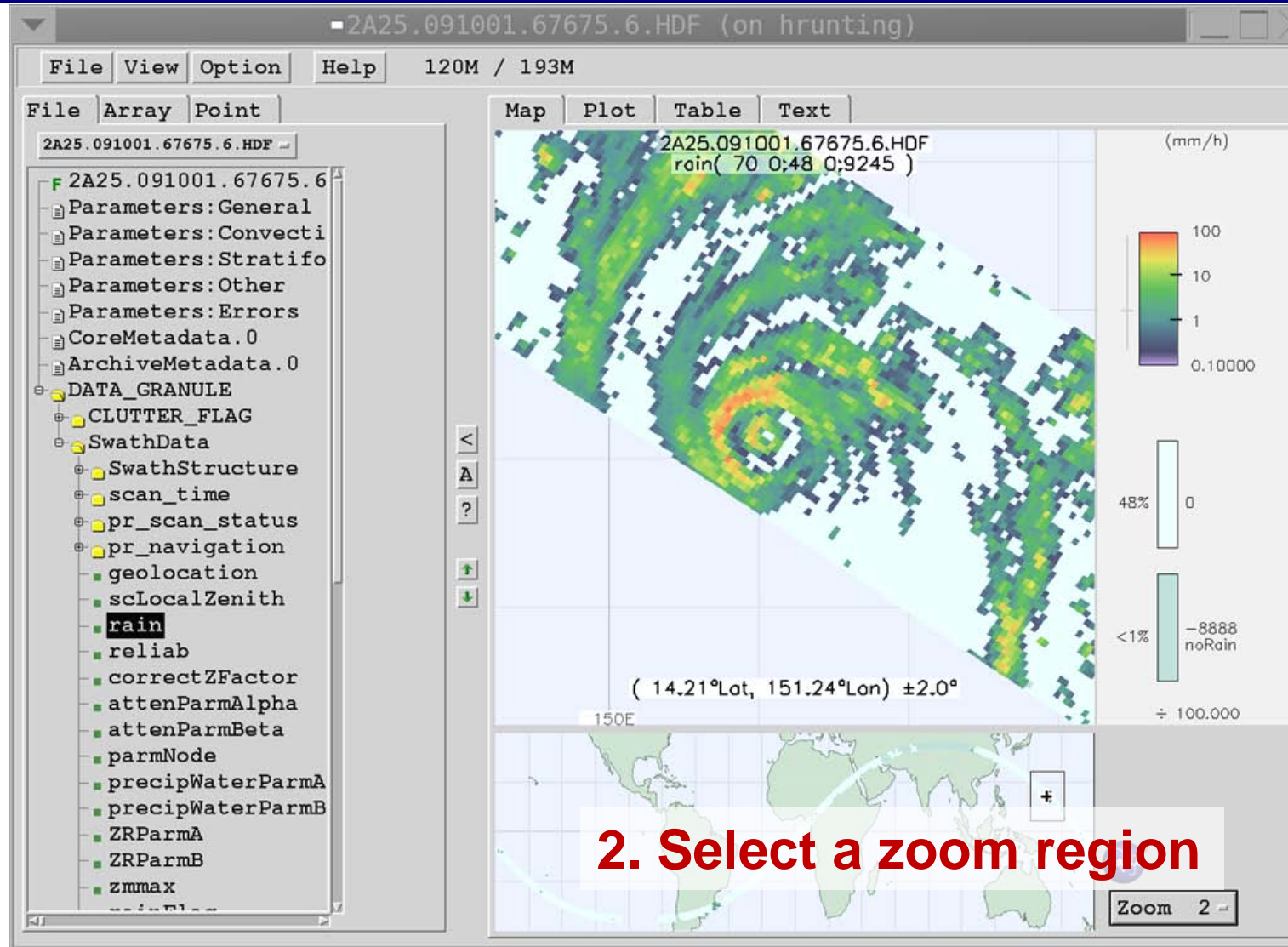


- Tool for High-resolution Observation Review (THOR)
- **Purpose:** THOR Desktop enables users to examine the contents of TRMM and GPM standard products.
- In 1997, NASA Goddard first released THOR under the name "Orbit Viewer".
- Download THOR Desktop from the PPS FTP site, and install it under Linux, Windows, or Mac OS X.

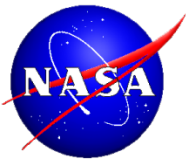


# THOR Desktop data viewer-select

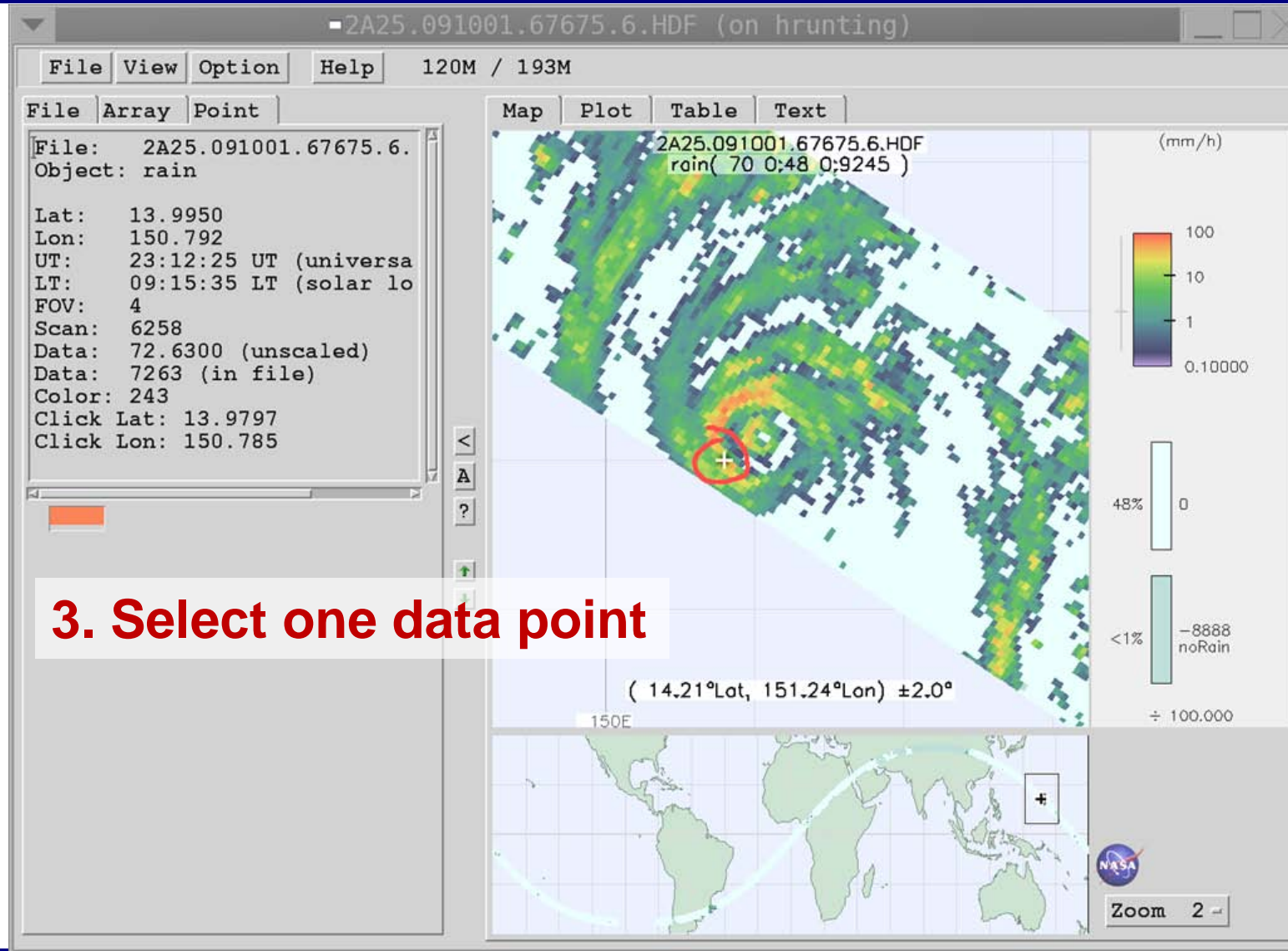




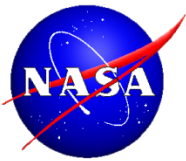




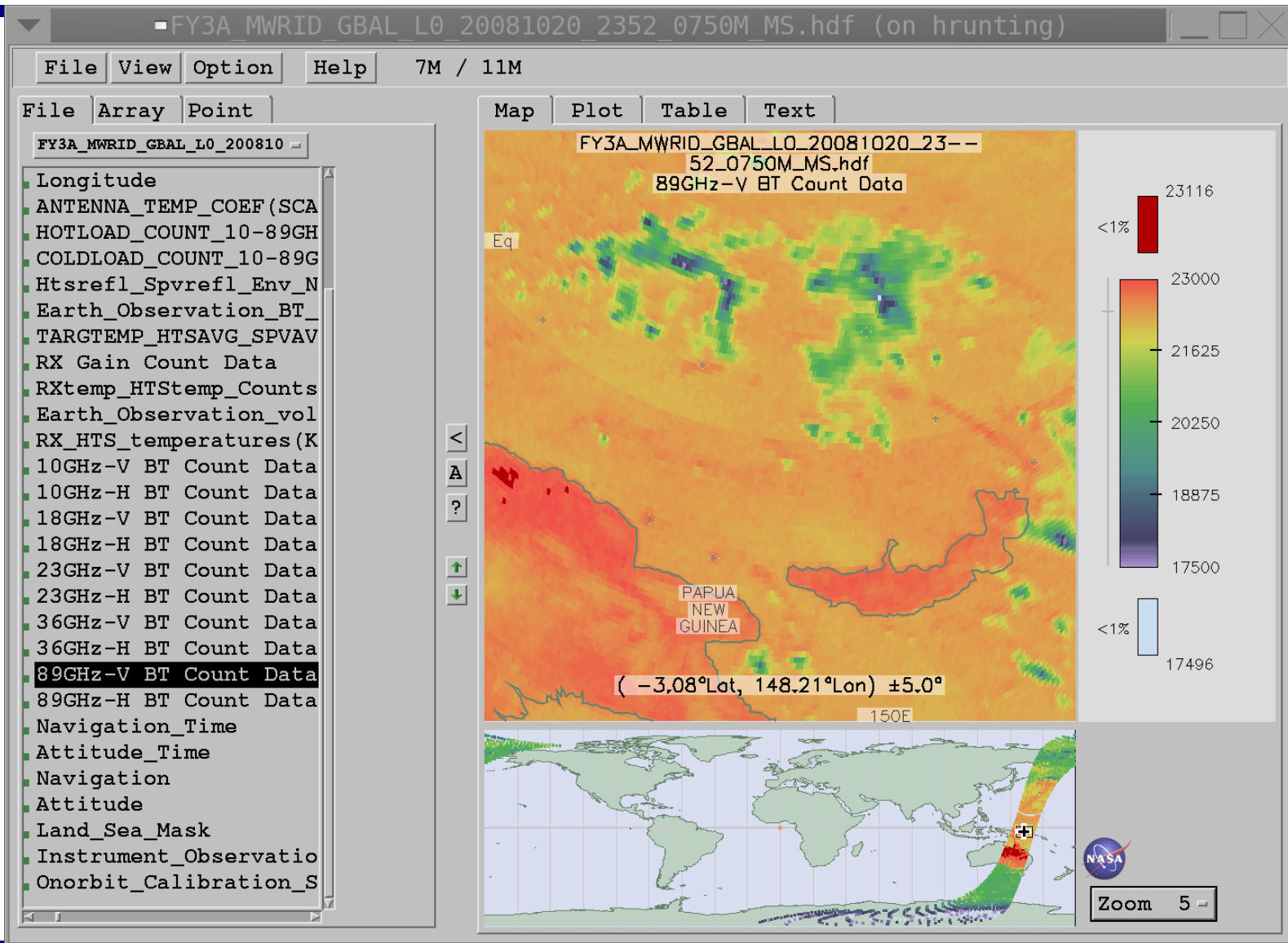
# THOR – data point

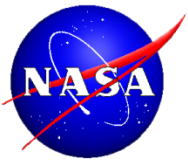


**3. Select one data point**



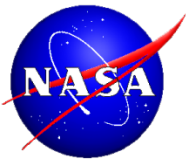
# Generic Nature of THOR-FY3 Data



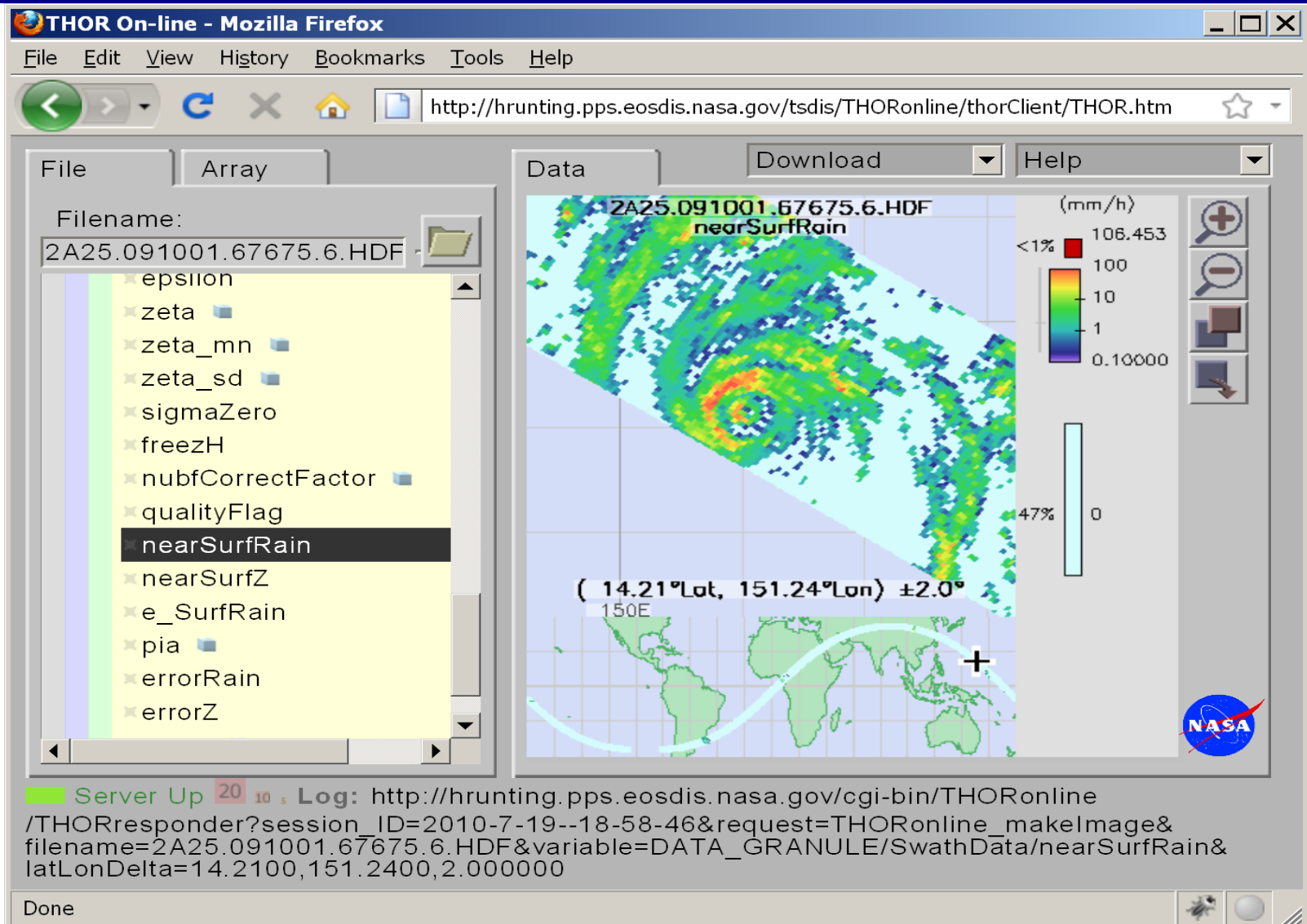


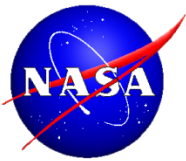
- **Purpose:** THOR Online is an online graphical interface to the dynamic images generated by THOR.
- Images created in about 2 to 4 seconds once the HDF file is uncompressed.
- The only online service that displays any variable of any orbit in the TRMM archive. The archive already contains ~1 million files and ~80 terabytes of data.





# THOR via browser





# Summary



- **Most of the services available from PPS for TRMM will be continued and extended for GPM**
- **All data will be maintained online (both near-realtime and regular)**
  - Previous version will be maintained online
  - So always two versions will be available for comparison purposes
- **Many services that are ad-hoc now or available only to registered users will be available generally**
- **PPS will always be able to do special requests for large data period subsetting (e.g. multiple years) that may not be possible via STORM**
- **Any additional service requests: [Erich.F.Stocker@nasa.gov](mailto:Erich.F.Stocker@nasa.gov)**